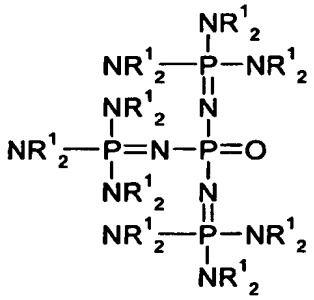
CLAIMS

1. A thermosetting polyamide foam prepared by reacting a polyisocyante compound with a polyester polycarboxylic acid using a compound having a P=N bond as a catalyst under conditions of an NCO index of not less than 1.6.

2. A thermosetting polyamide foam according to claim 1, wherein the polyester polycarboxylic acid has an acid value of not less than 20 mgKOH/g and not more than 70 mgKOH/g, and a hydroxyl number of not more than 1/8 of the acid value.

3. A thermosetting polyamide foam according to claim 1 or 2, wherein the NCO index is not less than 2.0 and not more than 3.0.

4. A method of producing a thermosetting polyamide comprising:
reacting a polyisocyanate compound with a polycarboxylic acid using:
(a) a phosphine oxide compound represented by formula (1):



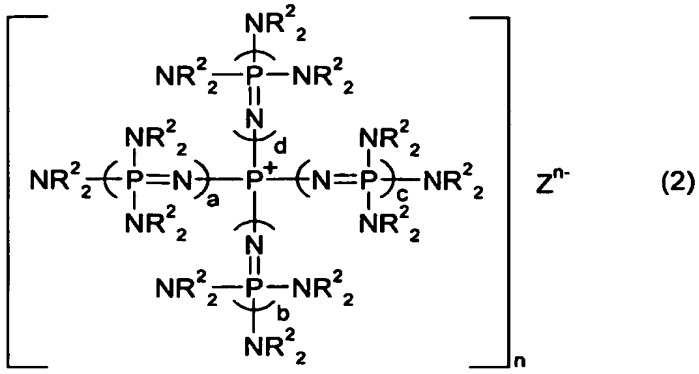
. x (H_2O) (1)

wherein:

R^1's are independently a hydrocarbon group of 1 to 10 carbon atoms, and two R^1's on one nitrogen atom may bind to each other to form a cyclic structure;

x, which denotes the amount of water contained in terms of molar ratio, is in the range of 0 to 5.0;

(b) a phosphazenium salt of an active hydrogen compound represented by formula (2):



(2)

wherein:

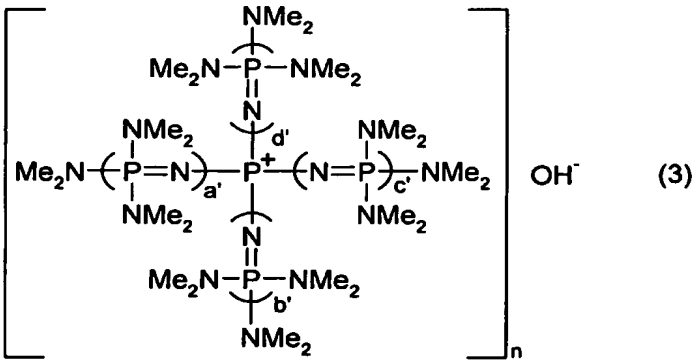
n, which is the number of phosphazenium cation, is an integer from 1 to 8;

Z^{n-} is an n-valent anion of an active hydrogen compound induced by elimination of n-protons from the active hydrogen compound having up to 8 active hydrogen atoms on an oxygen atom or on a nitrogen atom;

a, b, c and d are independently a positive integer of not more than 3 or zero, except that all of them can not be zero simultaneously; and

R^2's are independently a hydrocarbon group of 1 to 10 carbon atoms, and two R^2's on one nitrogen atom may bind to each other to form a cyclic structure; or

(c) a hydroxyl phosphazenium represented by formula (3):



(3)

wherein:

Me is methyl; and

a', b', c' and d' are independently 0 or 1, except that all of them cannot be zero simultaneously.

5. A thermosetting polyamide foam prepared by reacting a polyisocyanate compound with a polyester polycarboxylic acid using a catalyst substantially decomposed at a service temperature of the thermosetting polyamide foam.

6. A thermosetting polyamide foam according to claim 5, wherein the service temperature of the thermosetting polyamide foam is not less than 130°C and less than a decomposition temperature of the thermosetting polyamide foam.

7. A thermosetting polyamide foam according to claim 5, wherein the catalyst substantially decomposed at a service temperature of the thermosetting polyamide foam is used together with a tertiary amine compound catalyst.

8. A thermosetting polyamide foam according to claim 5, wherein the catalyst substantially decomposed at a service temperature of the thermosetting polyamide foam is used together with an alkali metal carboxylate catalyst and/or an alkaline-earth metal carboxylate catalyst.

9. A thermosetting polyamide foam according to claim 7 or 8, wherein the amount of the catalyst used in combination with the catalyst substantially decomposed at a service temperature of the thermosetting polyamide foam is less than 50% by weight of the amount of the catalyst substantially decomposed at a service temperature of the thermosetting polyamide foam.

10. A heat-resistant vibration damper comprising a thermosetting polyamide foam according to any one of claims 1 to 3 and 5 to 9.

11. A heat-resistant sound absorbing material comprising the thermosetting polyamide foam according to any one of claims 1 to 3 and 5 to 9.

12. A heat-resistant cushioning material comprising the thermosetting polyamide foam according to any one of claims 1 to 3 and 5 to 9.